

Code No: R204103C

R20

Set No. 1

IV B.Tech I Semester Regular Examinations, January – 2024
UNCONVENTIONAL MACHINING PROCESSES
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

UNIT - I

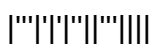
- 1 a) What is the need for unconventional machining processes? Describe in your own words. [7]
b) List the different abrasive materials used in AJM and also describe their characteristics. [7]
- (OR)
- 2 a) Describe how the mass flow rate and abrasive grain size affect the MRR in AJM process. [7]
b) Describe the effect of process parameters in WJM process. [7]

UNIT - II

- 3 a) Explain the USM machine setup with a schematic diagram. [7]
b) Describe the influence of Amplitude of vibration and feed force on MRR in USM process. [7]
- (OR)
- 4 a) Describe the advantages of USM process in detail. [7]
b) Derive the equation of material removal rate during USM process and also list out the assumptions that are made while calculating the MRR in USM process. [7]

UNIT - III

- 5 a) Describe the working principle of chemical machining process. [7]
b) Explain the Electrochemical Honing process with neat sketch. [7]
- (OR)
- 6 a) Describe the chemical reactions that occur during ECM process. [7]
b) Write the advantages, limitations and applications of chemical machining process. [7]



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UNIT - IV

- 7 a) What is flushing in EDM process? Explain about various flushing techniques. [7]
b) What are the process parameters that affect Wire Cut EDM process? Explain. [7]

(OR)

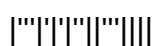
- 8 a) Explain the working principle of Electric Discharge Machining process with a neat diagram. [7]
b) Discuss the applications of EDM process? [7]

UNIT - V

- 9 a) Explain with neat sketch construction, working principle of the Laser Beam Machining Process. [7]
b) Describe the important considerations in the design of a plasma torch. What are the essential differences between a gas cutting and a welding torch? [7]

(OR)

- 10 a) Write any seven differences between LBM and EBM [7]
b) What are the characteristics of laser used in laser machining process? [7]



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Set No. 2

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Answer any FIVE Questions
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UNIT - I

- 1 a) What are the characteristics of UCM processes? [7]
b) How does AJM differ from conventional sand blasting process? Describe in detail. [7]
(OR)
- 2 a) What is operating principle of WJM? Explain with a neat diagram. [7]
b) Describe how the gas pressure and velocity of abrasive grain affect the MRR in AJM process [7]

UNIT - II

- 3 a) “USM offers a solution to the expanding need for machining brittle materials”. Justify the statement. [7]
b) Describe the limitations of USM process in detail. [7]
(OR)
- 4 a) Describe the influence of abrasive grain size and standoff distance on MRR in USM process. [7]
b) List the types of transducers in ultrasonic machining. Explain in detail. [7]

UNIT - III

- 5 a) Describe the ECM process with a schematic diagram. [7]
b) Explain the Electro-stream drilling process with neat sketch. [7]
(OR)
- 6 a) How shaped tube electrolytic machining different than ECM process. Explain in detail. [7]
b) Discuss the economic aspects of ECM process. [7]

UNIT – IV

- 7 a) How conventional grinding different than Electro discharge grinding. [7]
b) What are the advantages of EDM process? [7]

(OR)

- 8 a) Explain the working and construction of rotary impulse generator. [7]
b) What are the characteristics of EDM process? Explain them in brief. [7]

UNIT - V

- 9 a) Describe the construction of laser in LBM process with a neat sketch. [7]
b) Explain the differences between transferred and non transferred Plasma arc cutting systems. [7]

(OR)

- 10 a) Describe the industrial applications of Plasma cutting systems. [7]
b) Explain with neat sketch construction, working principle of the Electron Beam Machining Process. [7]

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Set No. 3

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UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks*

UNIT - I

- 1 a) Differentiate the conventional and unconventional machining processes in terms of principles. [7]
b) Write any seven applications of AJM process. [7]
(OR)
- 2 a) With a neat sketch explain the working of WJM process. [7]
b) Write any seven advantages of AJM process. [7]

UNIT - II

- 3 a) Describe the applications of USM process in detail. [7]
b) What are the components of the USM machine? Explain them in detail. [7]
(OR)
- 4 a) Describe the influence of concentration of slurry and amplitude of vibration on MRR in USM process. [7]
b) What are the economic considerations that are taken into account in selecting USM? [7]

UNIT - III

- 5 a) What are the limitations of ECM process? [7]
b) Explain the working principle of Electrochemical deburring process (ECDe) with neat sketch. [7]
(OR)
- 6 Explain the construction, working principle, advantages and applications of Electro chemical grinding process. [14]

UNIT - IV

- 7 a) What are the various spark erosion generators used in EDM process? Explain their characteristics. [7]
b) What are the limitations of EDM process? [7]
(OR)
- 8 a) What are the components of Wire Cut EDM process? Describe them with neat diagrams. [7]
b) What are the process parameters that affect the EDM process? Explain them in detail. [7]

UNIT - V

- 9 a) Explain the process parameters and mechanism of material removal of the Electron Beam Machining Process. [7]
b) Explain the effect of various process parameters on MRR in PAM process. [7]
(OR)
- 10 a) What are the advantages and limitations of PAC process? [7]
b) Sketch the electron beam gun and explain the functions of each part. [7]

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Set No. 4

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UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Answer any FIVE Questions
ONE Question from Each unit
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UNIT - I

- 1 a) Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job. [7]
b) Describe the working principle of abrasive jet machining. [7]
(OR)
- 2 a) Unconventional machining process has replaced many conventional metal cutting processes, Justify using examples. [7]
b) Write any seven applications of WJM process. [7]

UNIT - II

- 3 a) Describe the characteristics of USM? [7]
b) Describe the mechanics of material removal in USM process. [7]
(OR)
- 4 a) What are the different types of feed mechanisms used in USM process? Describe any two. [8]
b) Describe the limitations of USM process. [6]

UNIT - III

- 5 a) What are the main functions of electrolyte in ECM process? Explain. [7]
b) What are the different steps involved in chemical machining process? Explain. [7]
(OR)
- 6 a) What are the applications of ECM process? [7]
b) Describe the chemistry involved in ECM process with a diagram. [7]

UNIT – IV

- 7 a) Describe the power circuits used for EDM process. [7]
b) What are the applications of Wire Cut EDM process? [7]
(OR)
8 a) Explain the principle of working of WCEDM process. [7]
b) What are the functions of dielectric fluid used in EDM process? Explain them in detail. Also name some dielectric fluids used in EDM process. [7]

UNIT - V

- 9 a) Explain mechanism of material removal of the Plasma Arc Machining Process. [7]
b) Write the differences between gas cutting and plasma arc machining. [7]
(OR)
10 a) What are the advantages of electron beam over laser beam machining process? [7]
b) Explain with neat sketch construction, working principle of the Plasma Arc Machining Process. [7]